

” ELECTRON SPIN RESONANCE SPECTRAL STUDY OF PVC AND XLPE INSULATION MATERIALS AND THEIR LIFE TIME ANALYSIS”

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ABSTRACT

Electron spin resonance (ESR) study is carried out to characterize thermal endurance of insulating materials used in power cable industry. The presented work provides ESR investigation and evaluation of widely used cable insulation materials, namely polyvinyl chloride (PVC) and cross-linked polyethylene (XLPE). The results confirm the fact that PVC is rapidly degrades than XLPE. The study also indicates that colorants and cable's manufacturing processes enhance the thermal resistance of the PVC. It also verifies the powerfulness and the importance of the ESR-testing of insulation materials compared to other tests assumed by International Electrotechnical Commission (IEC) Standard 216- procedure, e.g. weight loss (WL), electric strength (ES) or tensile strength (TS). The estimated thermal endurance parameters by ESR-method show that the other standard methods overestimate these parameters and produce less accurate thermal life time curves of cable insulation materials.